Moving Toward Gender Equity in the STEM Workplace

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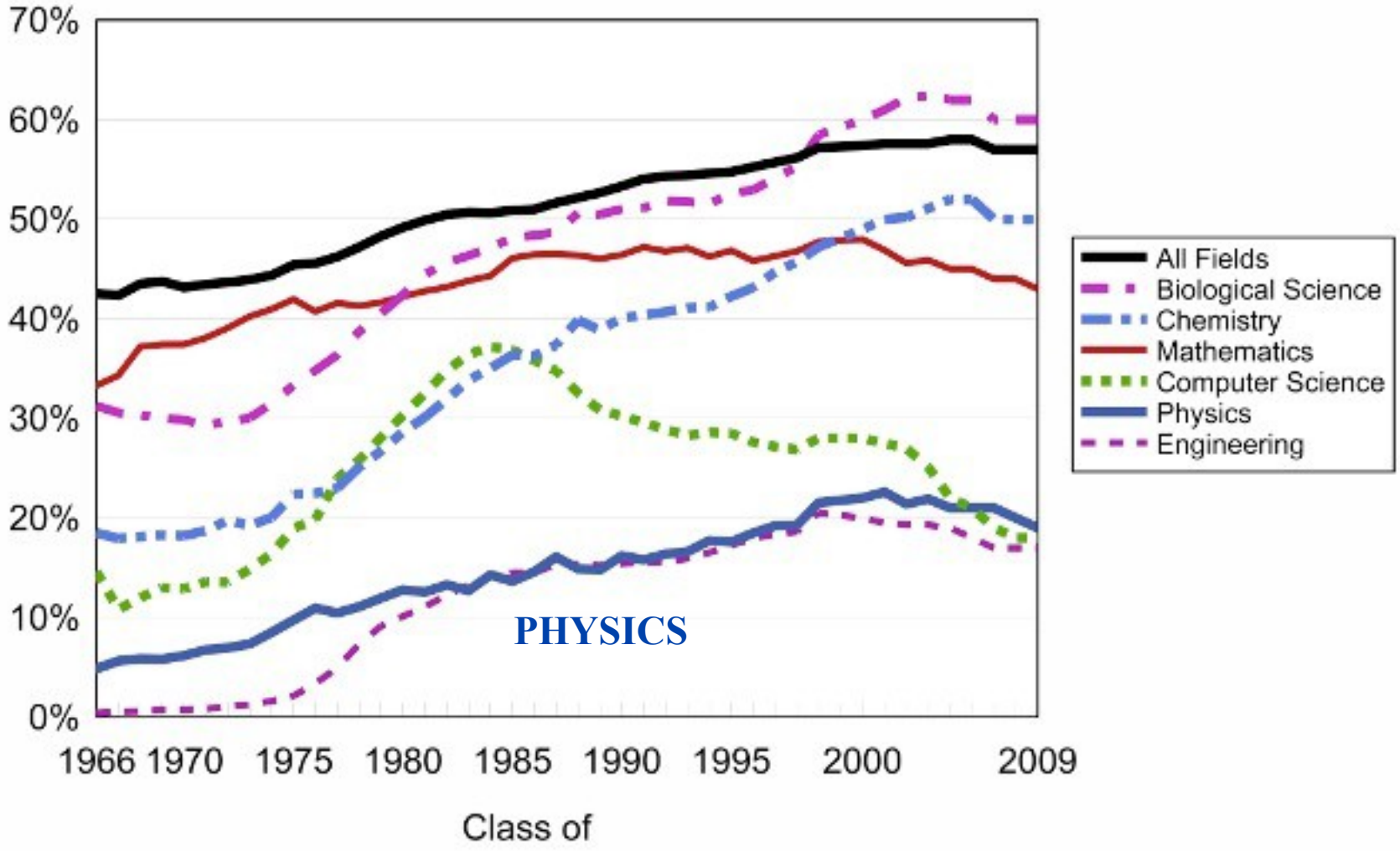
Fermilab May 26, 2015

Context

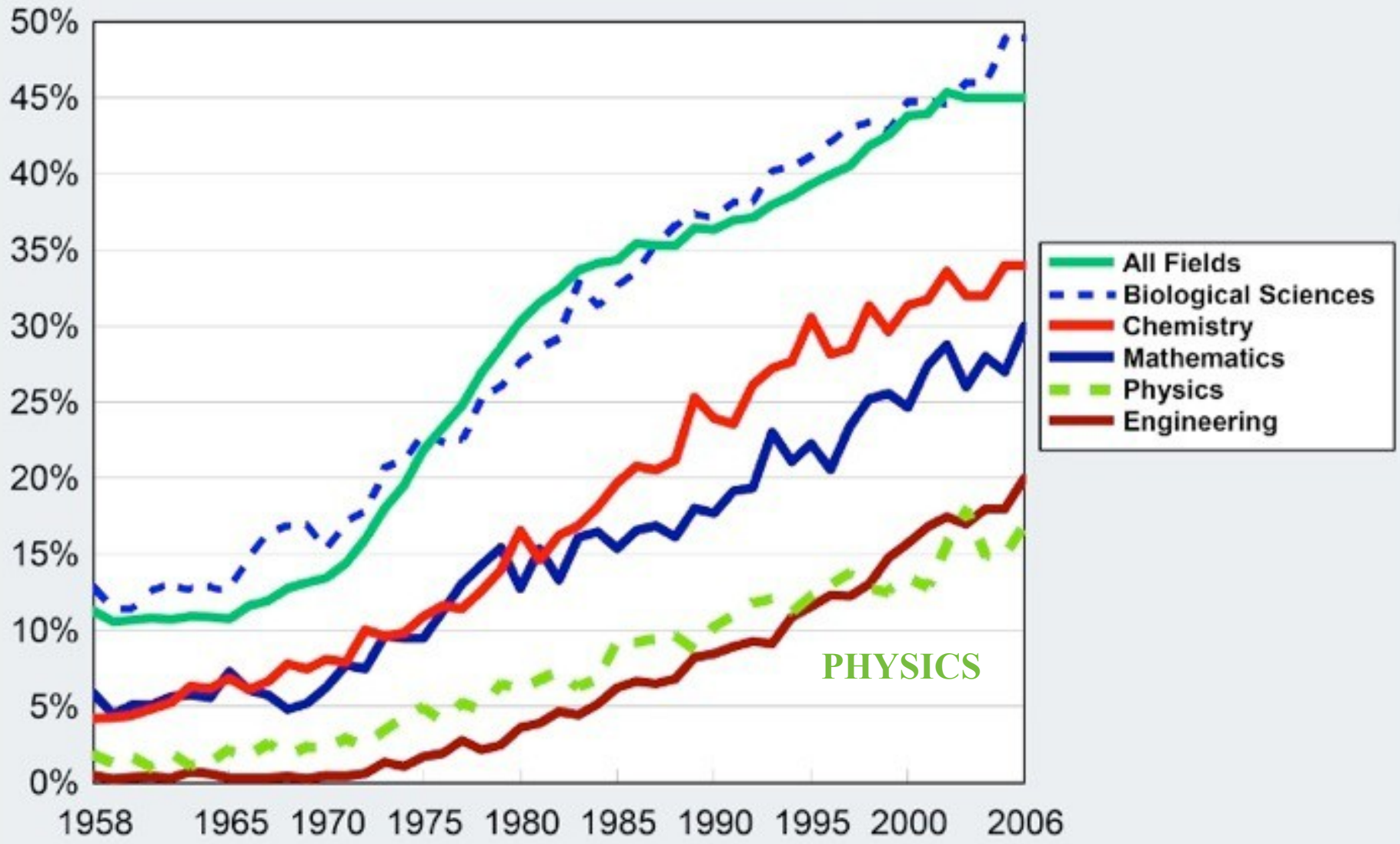
Percent of Bachelor's Degrees Earned by Women in Selected Fields, 1966-2009



National Center for Education Statistics. Data for class of 1999 were not available.

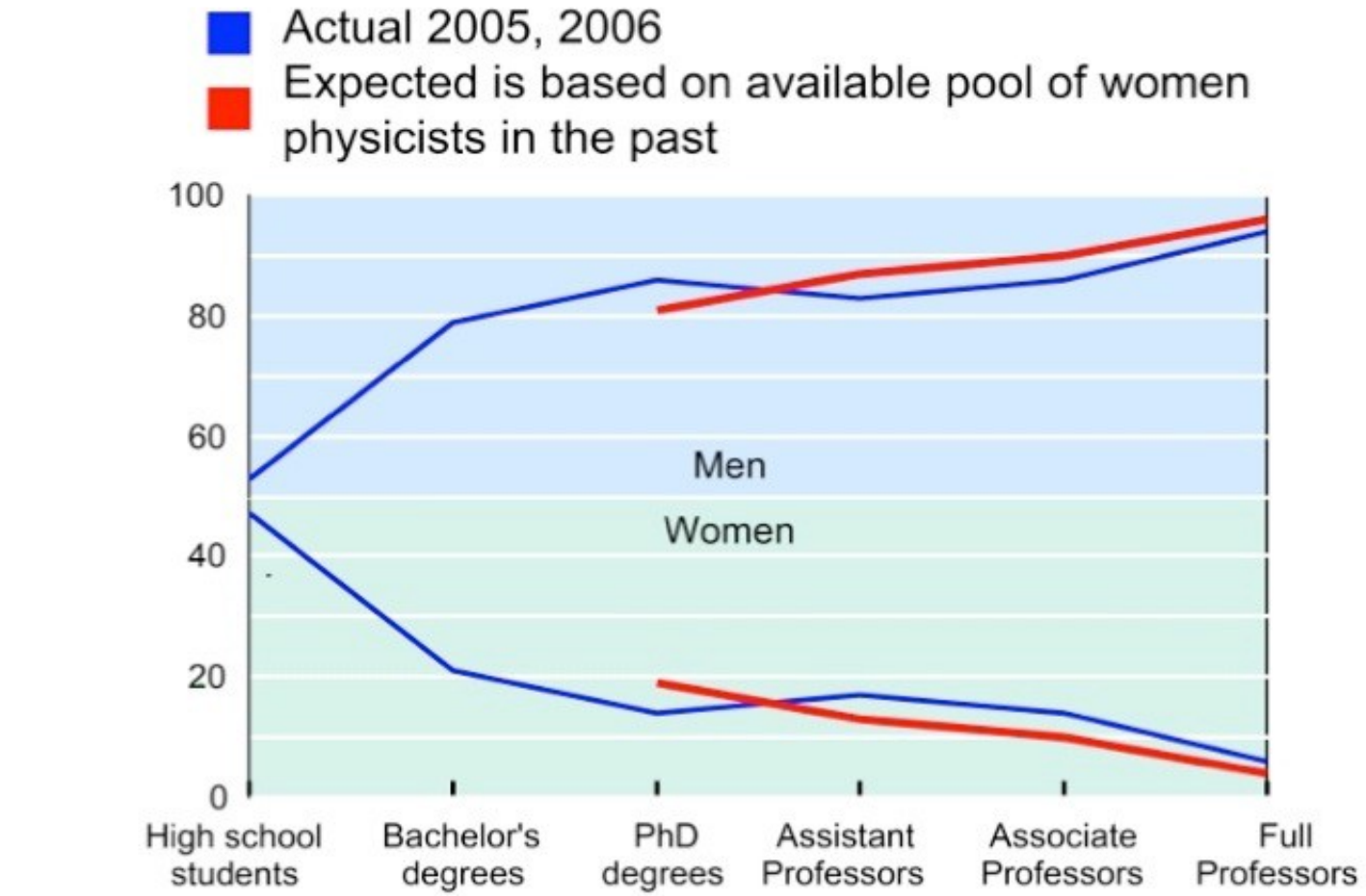
Compiled by American Institute of Physics Statistical Research Center

Percent of PhDs earned by women in selected fields, 1958-2006



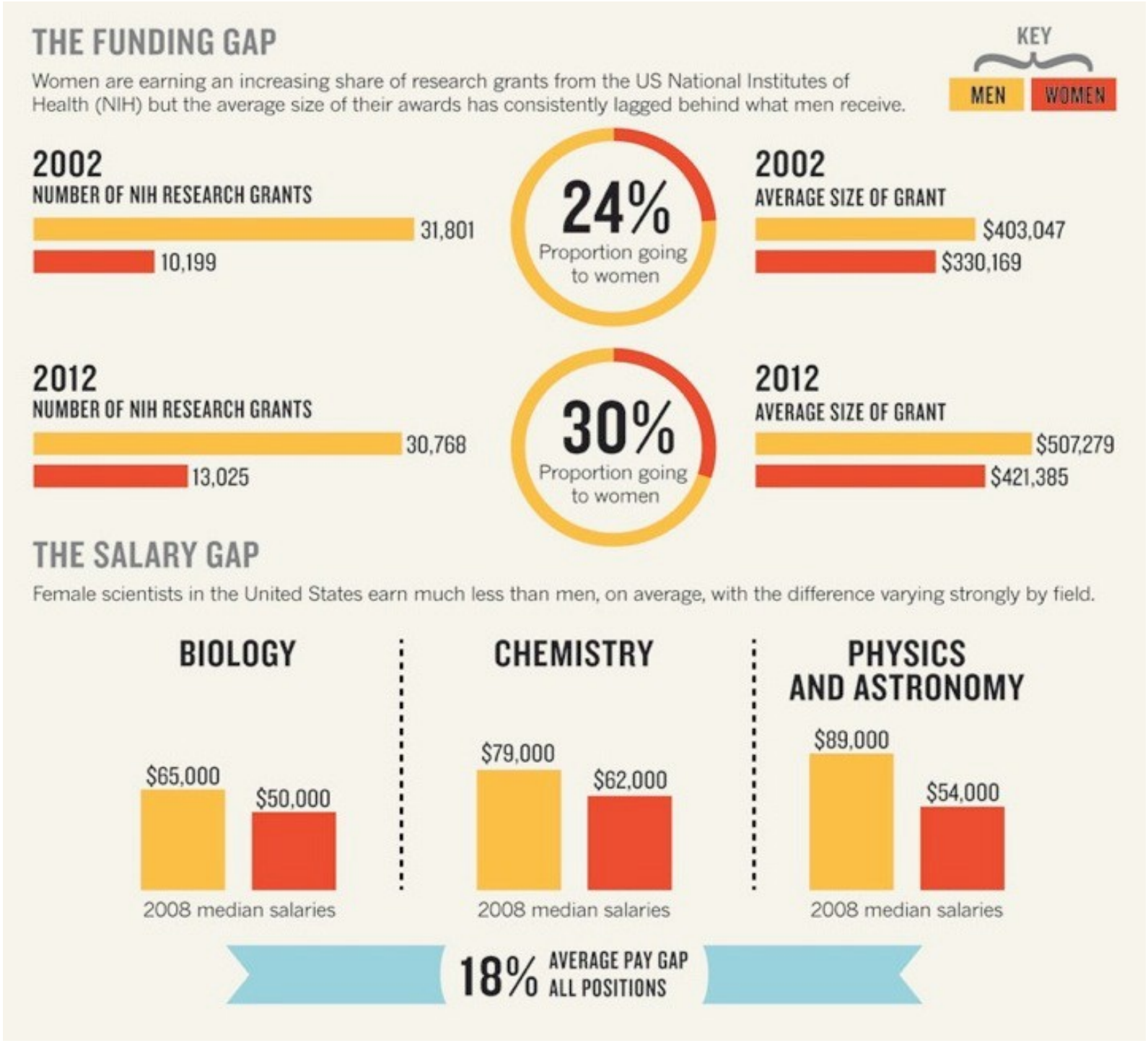
AIP Statistical Research Center. Compiled from data collected by National Science Foundation.

The "scissors plot" summarizing these results reveals a dearth of women physicists



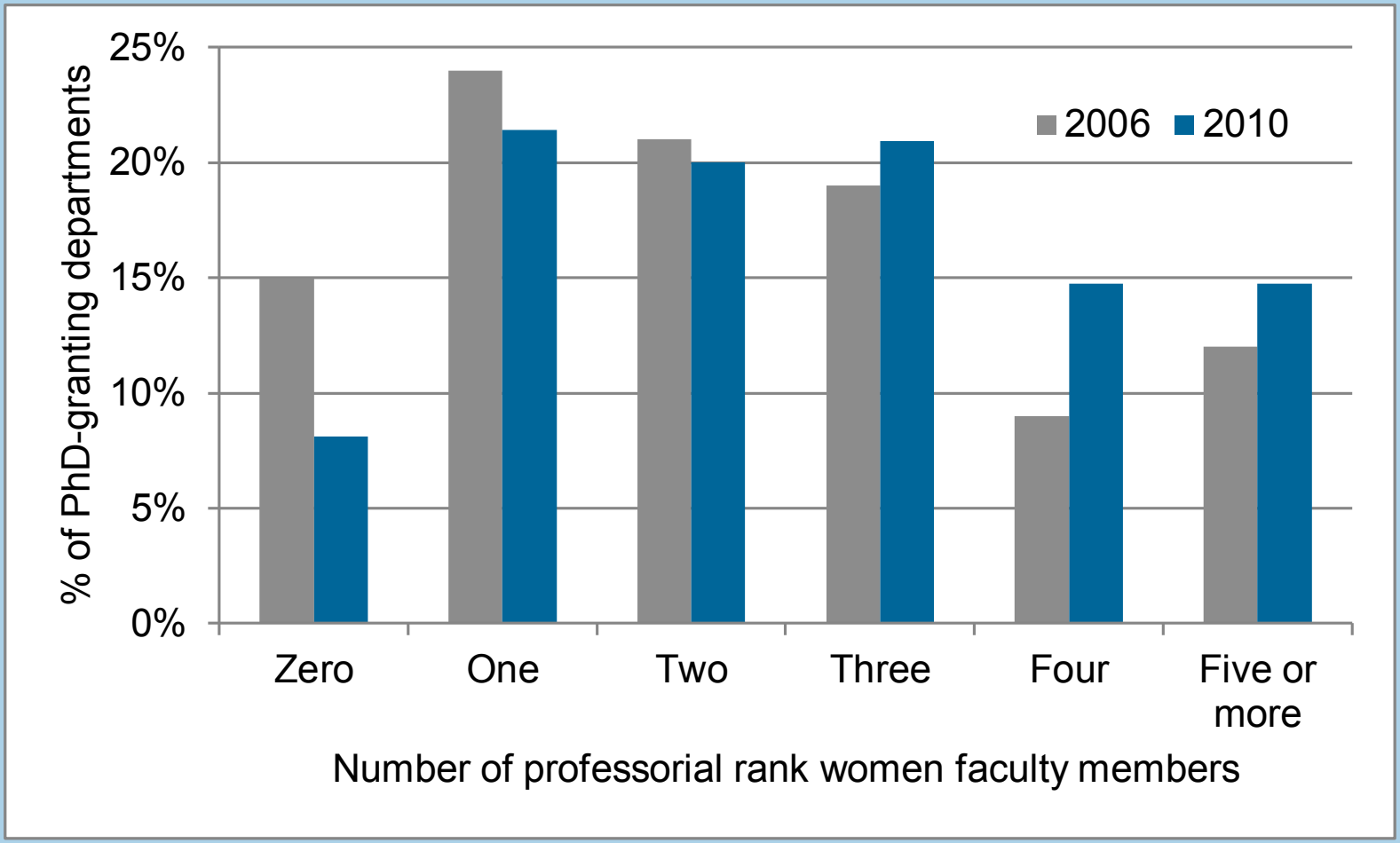
Source: American Institute of Physics Statistical Research Center

This is a problem for Physics… and STEM!



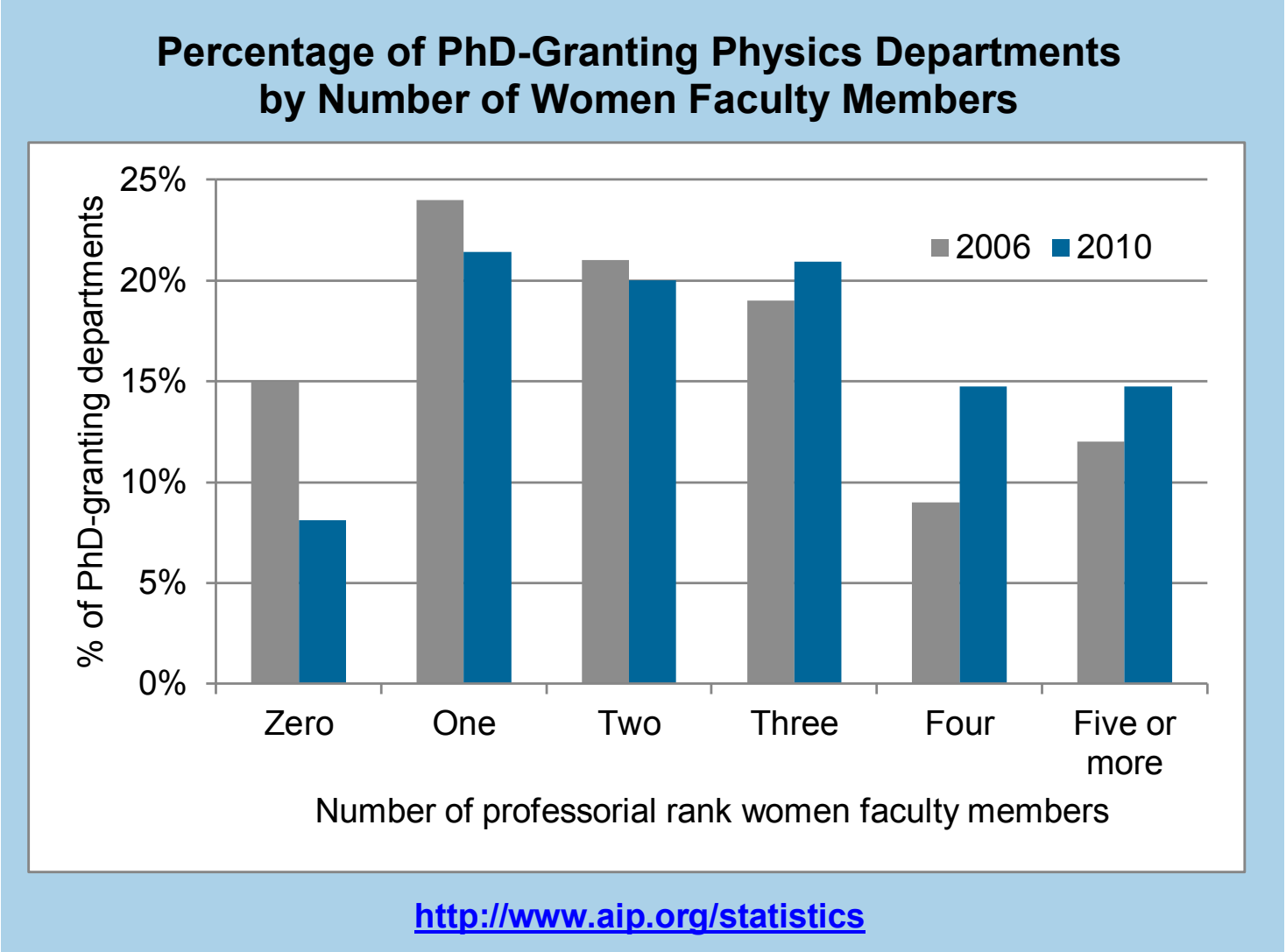
Nature, Vol 495, 7 March 2013

Percentage of PhD-Granting Physics Departments by Number of Women Faculty Members



http://www.aip.org/statistics

There are ~190 such departments and the median number of faculty is 29.



http://www.aip.org/statistics

What is it like to be 1 woman out of 29 employees?

Or the only person of color? or the only openly LGBTQ individual?

There are ~190 such departments and the median number of faculty is 29.

Causes for Concern

[adapted from APS Women in Physics site
http://www.aps.org/programs/women/reports/bestpractices/]

No effort to develop a sense of community or improve the climate. Denial that such issues matter to people.

A sub-critical mass of female employees; premature departure of female employees.

Lack of investment in and/or promotion of female employees at all levels. No visible leadership roles for female employees in the unit.

Isolation or marginalization of female employees.

Derogatory comments about female employees to reduce their ability to bring about change (e.g., "difficult" or "troublemaker").

A highly politicized climate where decision-making processes are not transparent.

Inability on the part of senior female scientists or engineers to get sufficient laboratory space, research funding, or other resources needed to become leaders in their fields.

Strong support for more junior employees who are not in a position to drive change, but weak support for senior female employees who attempt to change the climate.

Causes for Concern

[adapted from APS Women in Physics site]

What examples have you heard of, witnessed, or experienced, or had to deal with in your role?

No effort to develop a sense of community or improve the climate. Denial that such issues matter to people.

Sub-critical mass of or premature departure of under-represented (UR) employees.

Lack of investment in and/or promotion of UR employees at all levels. No visible leadership roles for UR employees in the unit.

Isolation or marginalization of UR employees.

Derogatory comments about UR employees to reduce their ability to bring about change (e.g., "difficult" or "troublemaker").

A highly politicized climate where decision-making processes are not transparent.

Inability on the part of senior UR scientists or engineers to get sufficient laboratory space, research funding, or other resources needed to become leaders in their fields.

Strong support for more junior employees who are not in a position to drive change, but weak support for senior UR employees who attempt to change the climate.

Challenges and Solutions

Implicit Bias

The Gender Equity Project, VirginiaValian

- We are all (regardless of our gender) prone to unintentional bias related to gender

  Think not? Try the Implicit Associations Test at

  https://implicit.harvard.edu/implicit/demo

- This affects many decisions we make in the course of our professional duties

- Relevant concepts include:
  - accumulation of disadvantage
  - gender schemas
  - stereotype threat

What are Gender Schemas?

The Gender Equity Project,
VirginiaValian 2006

- Gender schemas are hypotheses about what it means to be male or female.
- We all - male and female alike - share these hypotheses.
- Schemas assign different psychological traits to males and females (Martin and Halverson, 1987).

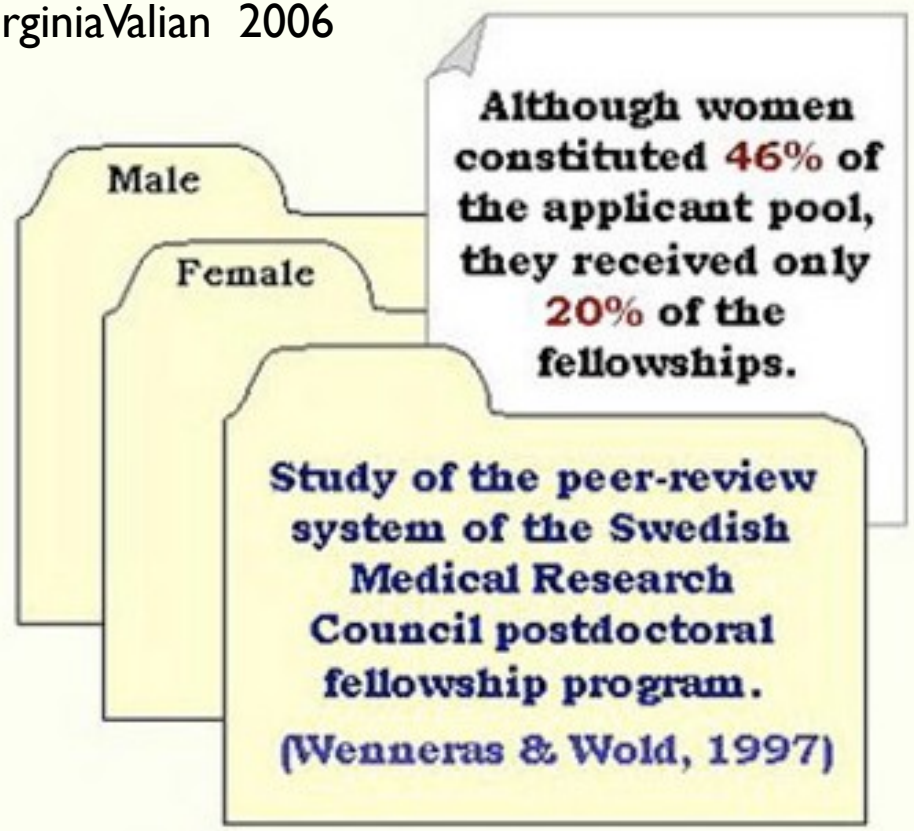
Stereotype threat

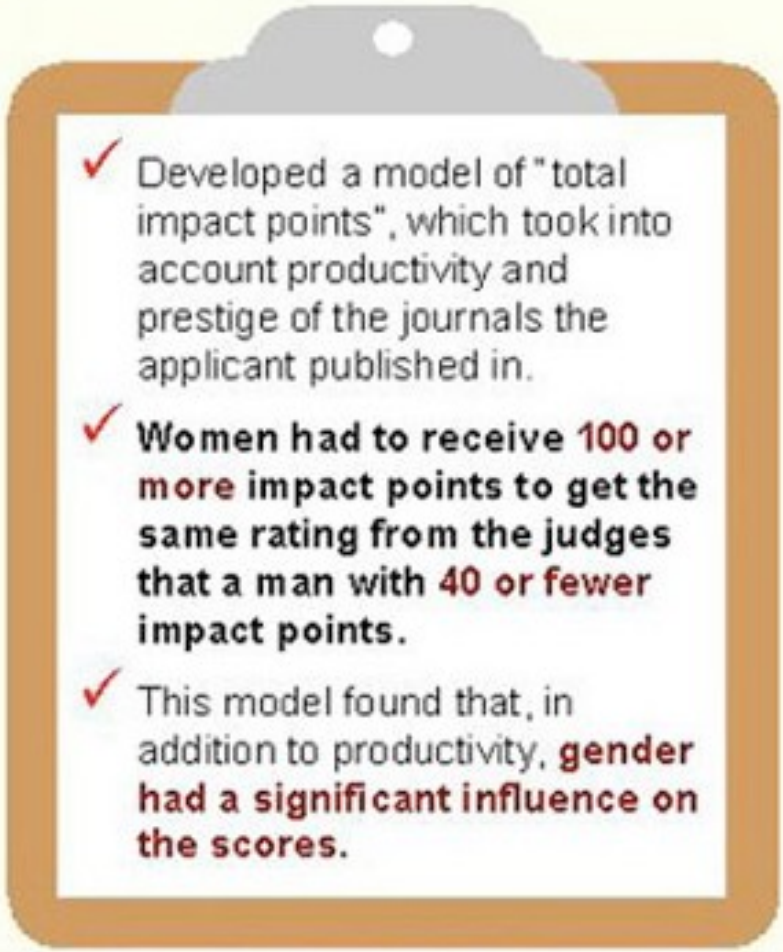
When women & minorities feel at risk of confirming a negative stereotype about their group, this can affect their ability to succeed in STEM.

See, e.g.,
Whistling Vivaldi
by Claude Steele

Gender Bias in Peer Review

Slide from:The Gender Equity Project,
VirginiaValian 2006





IMPACT Women have to meet a higher standard in order to receive the same recognition that men do.

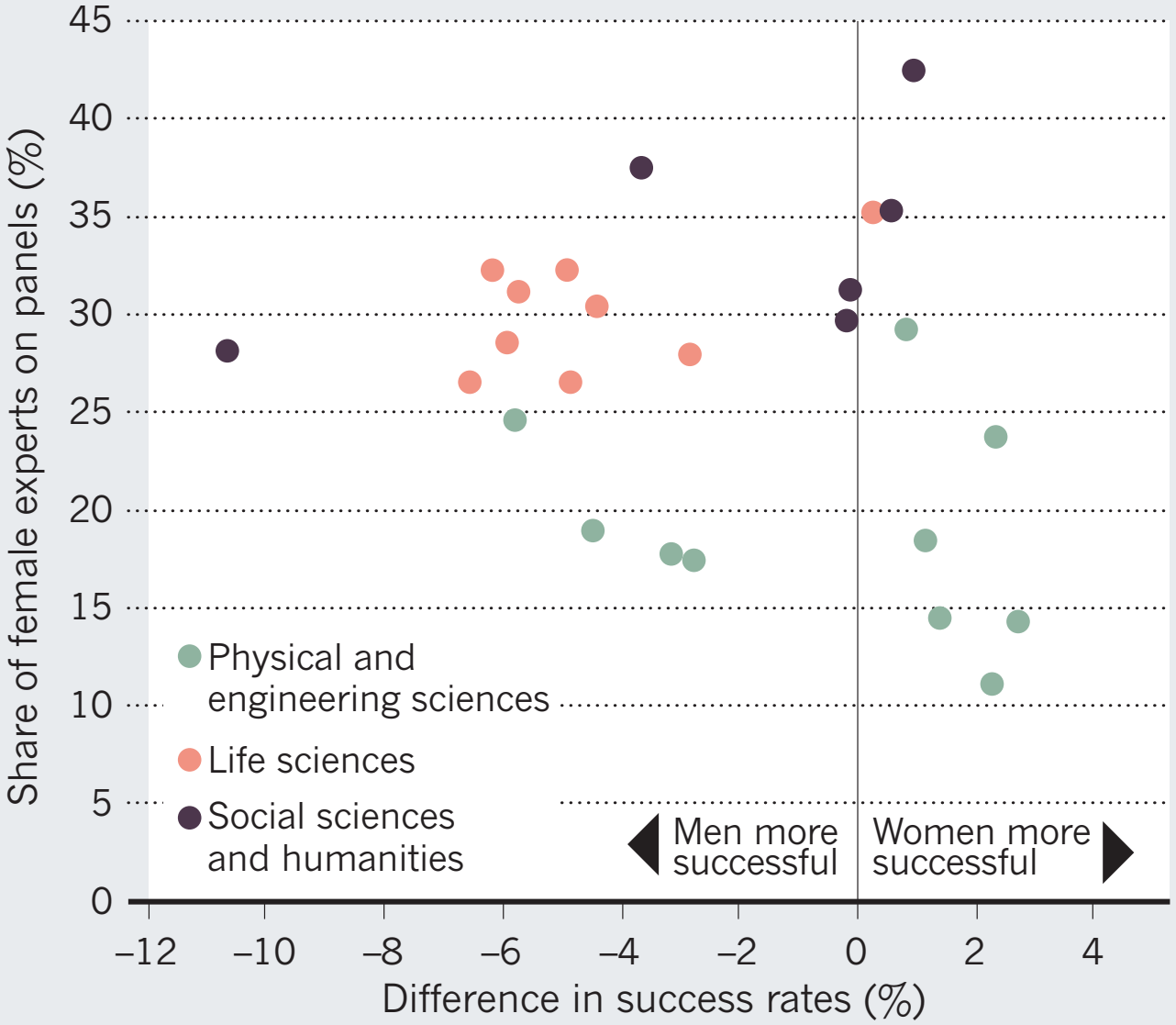
Has time cured this? Alas no... see Moss-Racusin et al., PNAS 12111286109 (2012).

Worse, we are all biased...

Nature, Vol. 45, 7 March 2013

GRANT GAP

Aggregating data for 2008–12, the European Research Council found no correlation between the percentage of women on its evaluation panels and the success rate of female applicants.



Related results in Moss-Racusin et al., PNAS 12111286109 (2012).

- **solutions** include:
  - ✳ leaders emphasize importance of diversity for achieving institutional goals
  - ✳ institutions ensure criteria and processes for hiring, promotion and awards are clear, written, and available
  - ✳ HR departments and hiring/award committees
    - ✳ frame searches broadly to attract a diverse pool
    - ✳ are trained to recognize and minimize implicit bias
    - ✳ explicitly use multiple dimensions to evaluate candidates' qualifications (e.g.# publications, research impact, patents, projects led successfully)
    - ✳ have women interviewees meet women employees
  - ✳ units and professional societies offer professional development opportunities for women at all levels

What solutions are the the National Labs using?
What others should they try?

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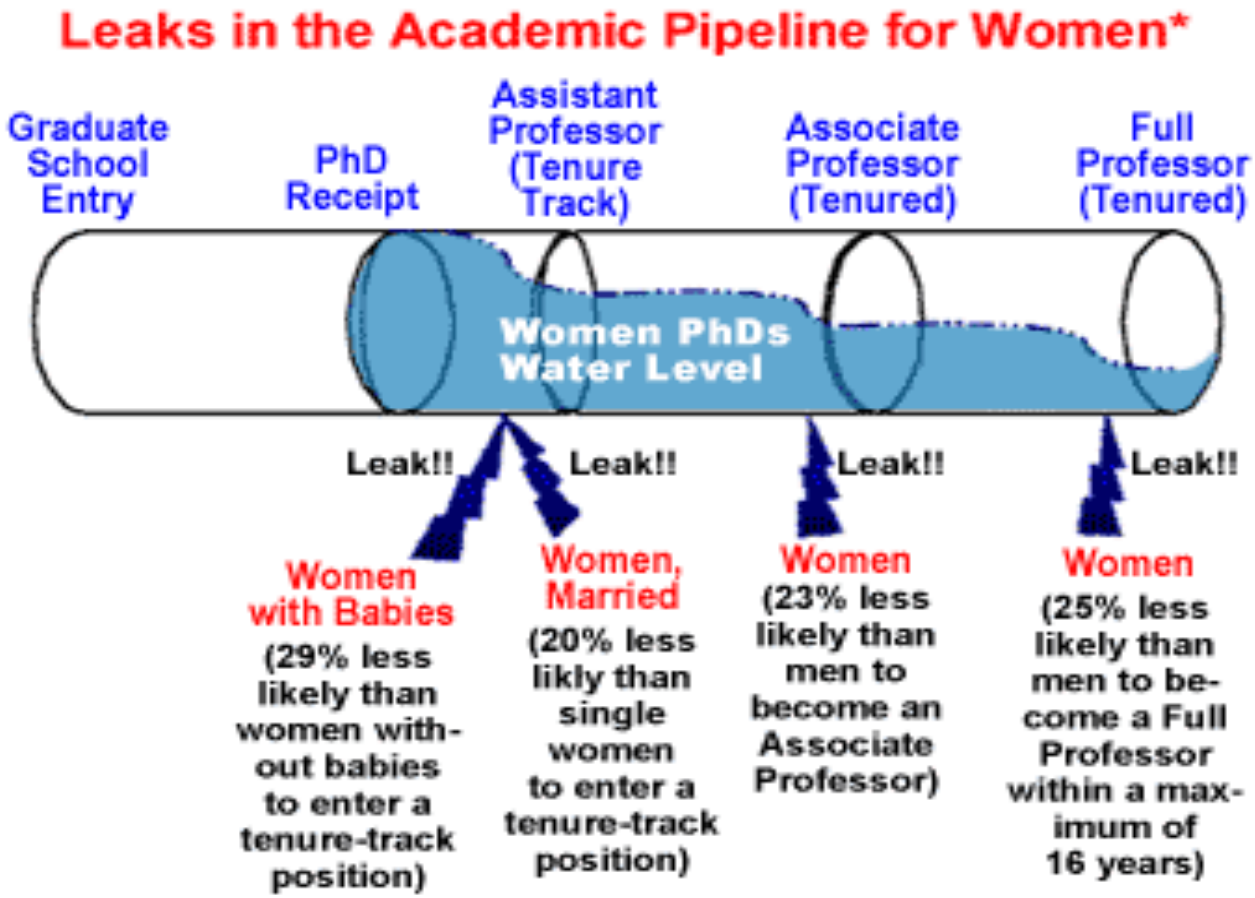
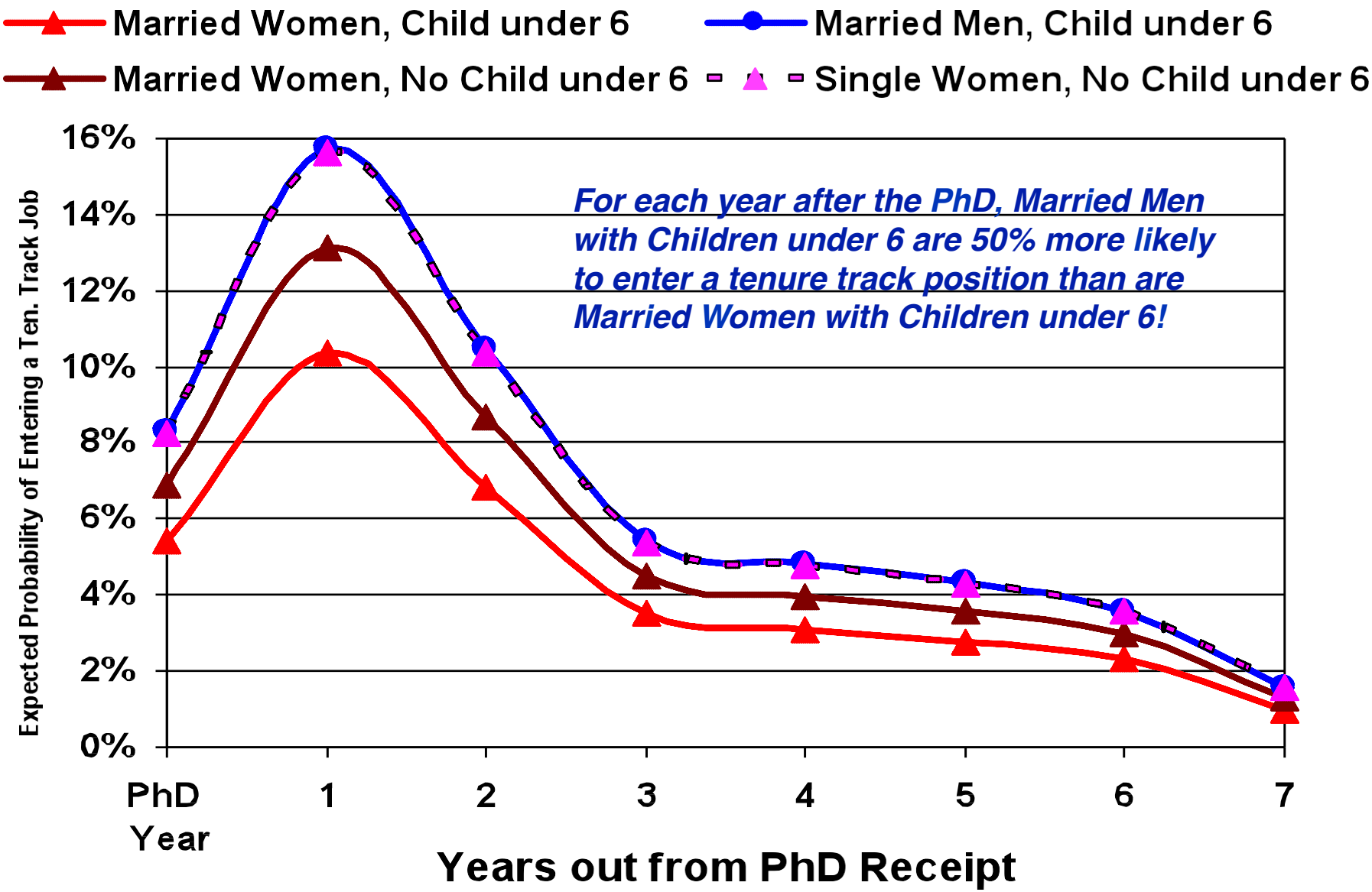
Family Responsibilities

Report on the UCWork and Family Survey; Mary Ann Mason, Angelica Stacey, and Mark Goulden, 2004; *Do Babies Matter?* Mary Ann Mason and Mark Goulden 2002



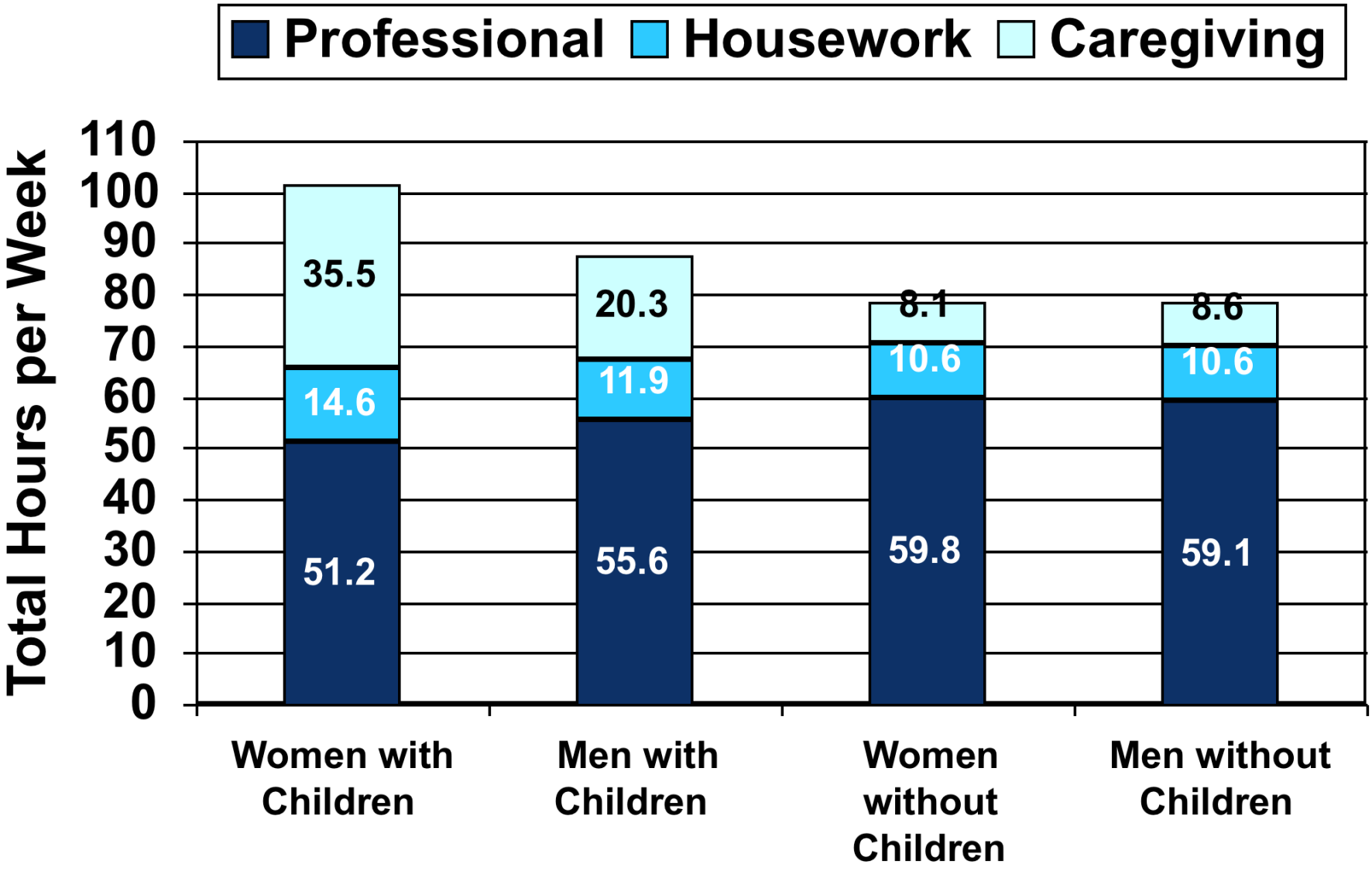
Mason, Stacy, and Goulden, 2004; Data from NSF Survey of Doctorate Recipients 1981-1995

Leaks in the Pipeline: PhD to Tenure Track Position



Mason, Stacy, and Goulden, 2004; Data from NSF Survey of Doctorate Recipients 1981-1995

Everybody is Very Busy

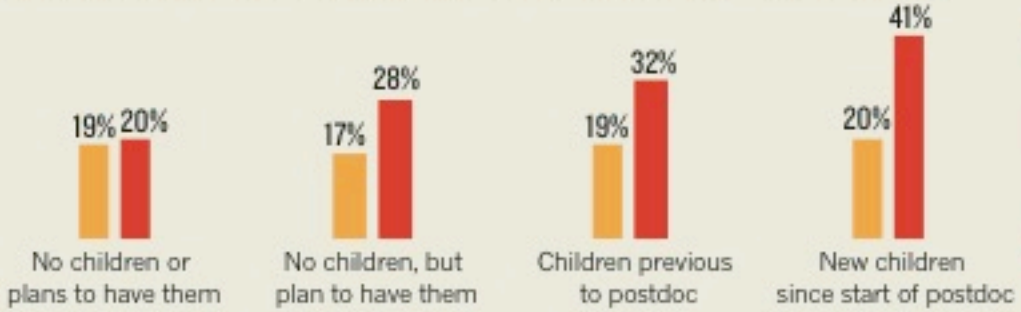


Mason, Stacy, and Goulden, 2004; Data on UC faculty, ages 30-50

POSTGRADUATE POSITIONS

A 2009 survey of postdoctoral fellows at the University of California showed that women who had children or planned to have them were more likely to consider leaving research.

POSTDOCS WHO DECIDED AGAINST CAREERS AS RESEARCH FACULTY MEMBERS (2009)



"The plan to have children in the future, or already having them, is responsible for an enormous drop-off in the women who apply for tenure-track jobs."

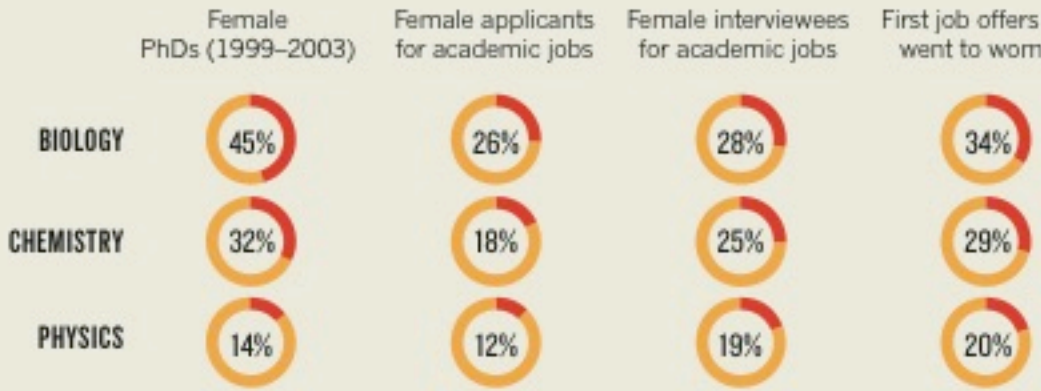
Wendy Williams, Cornell University

EARLY CAREER

Female representation among science and engineering faculty members in the United States has lagged behind gains in graduate education, in part because many women do not apply for tenure-track jobs. But women who do apply are more likely than men to receive interviews and offers.

"At least part of the lack of applications is due to the fact that women look at these careers and don't see people like themselves."

Hannah Valantine, Stanford University



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solutions include:

- employers provide gender-neutral parental leave, promotion-clock adjustment, modified duties for parental or elder care and ensure these will not impact evaluation for promotion
- employers (HR) ensure policies are clear, well-advertised, gender-neutral and framed as entitlements, not exceptions [to minimize "bias avoidance" behavior]
- unit heads and mentors openly offer support and advice on work-life balance to all new employees, so this is seen as a normal aspect of professional life
- units schedule all meetings during business hours
- units and professional societies offer childcare support for employees attending conferences

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Dual-Career Couples

- a pervasive issue in physics

  (Dual-Science-Couple Survey, McNeil & Sher, 1998; 1990 APS Survey)

  - 68% (18%) of **married** physicists have scientist spouses
  - 31% (6%) of **all** physicists < 31yrs have scientist spouses
  - In 85% of couples, man is older [thus, more senior in job]
  - Dual-science-couples seeking first faculty jobs reported
    - short-term career goals affected by these issues (**86%**)
    - one partner (usually woman) was under-employed (**60%**)

- **solutions** include:

  ✳ Employers advertise clear, gender-neutral partner hire policies

  ✳ Employers support 2nd partner's career success

  ✳ Employers reframe dual-career assistance as recruitment tool

  ✳ Employers form Recruitment Consortia

  ✳ Senior job candidates raise dual-career issues early [model]

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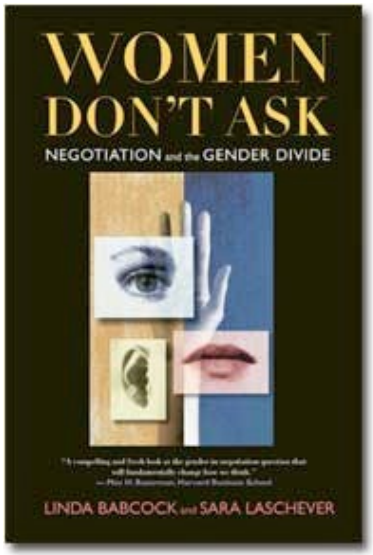
  - ✳ Employers form Recruitment Consortia
  - ✳ Senior job candidates raise dual-career issues early [model]

Negotiation

Women Don't Ask: Negotiation and the Gender Divide (Linda Babcock & Sarah Laschever, 2003)

- Women avoid negotiation because they are
  - unsure what they "deserve"; fear asking too much
  - worried about harm to relationships
  - less optimistic about benefits of negotiation
  - not confident of their negotiation skills
  - relatively risk-averse



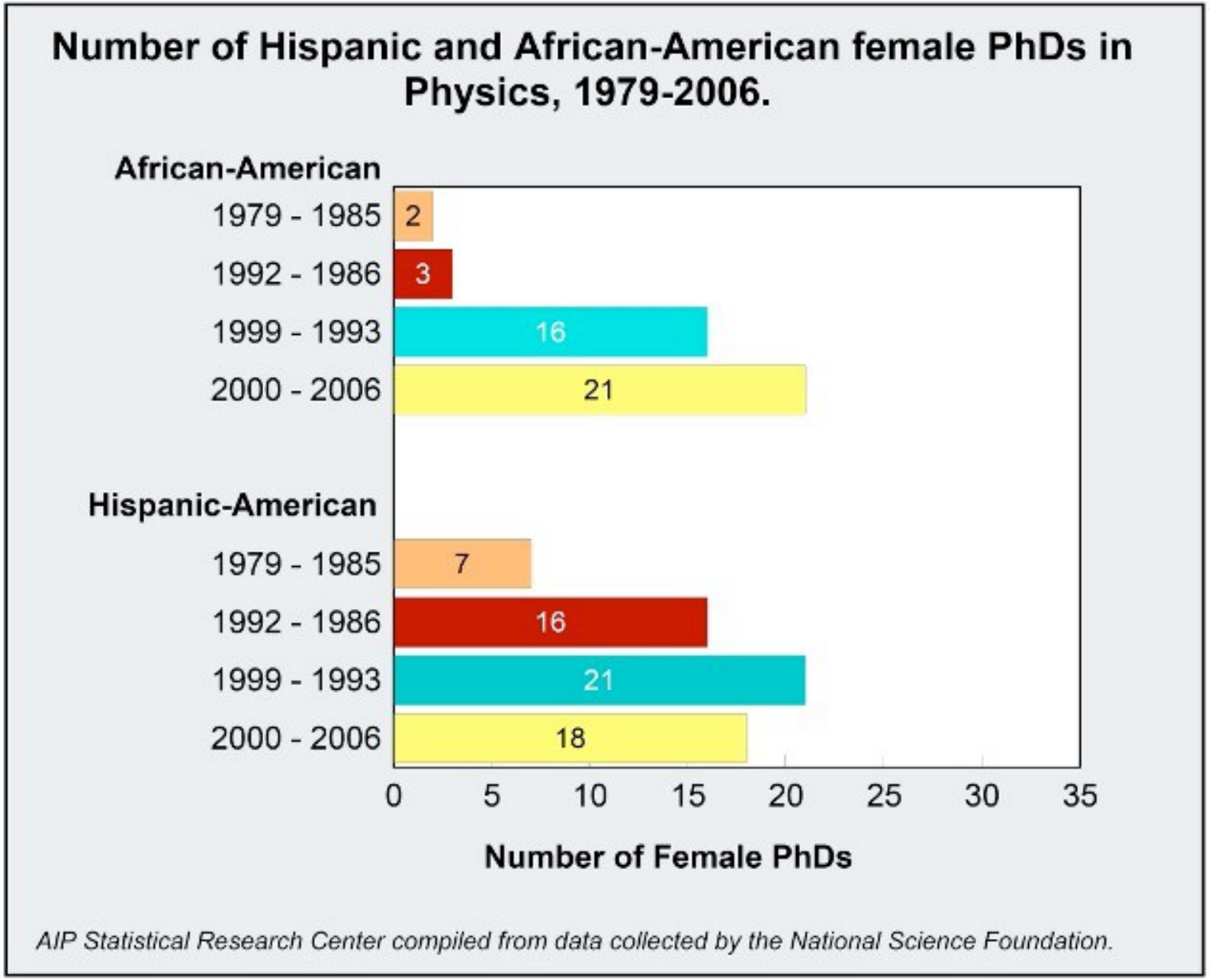
- In negotiations, women tend to
  - ✳ ask for less -- and therefore receive less
  - ✳ use "interest-based" negotiation approach, focused on underlying needs/motives rather than narrow concrete goals

(*Getting to Yes: Negotiating Agreement Without Giving In, Roger Fisher & William Ury, 1990*)

- Solutions include
  - ✳ Professional organizations offer workshops on negotiation skills
    e.g. APS Professional Skills Development Workshops offered annually at major physics meetings (sponsored by NSF); has impacted > 250 women physicists since 2005
    http://www.aps.org/programs/women/workshops/skills/
  - ✳ Mentors teach women (and men) that interest-based negotiation is very effective and improves professional relationships
  - ✳ Mentors recommend targeted readings such as *Ask For It* (Babcock/Laschever, 2009) and *Getting to Yes* (Fisher/Ury, 1990)
  - ✳ Employers offer clear directions to job finalists to avoid unintended bias in discussions of salary and hiring packages

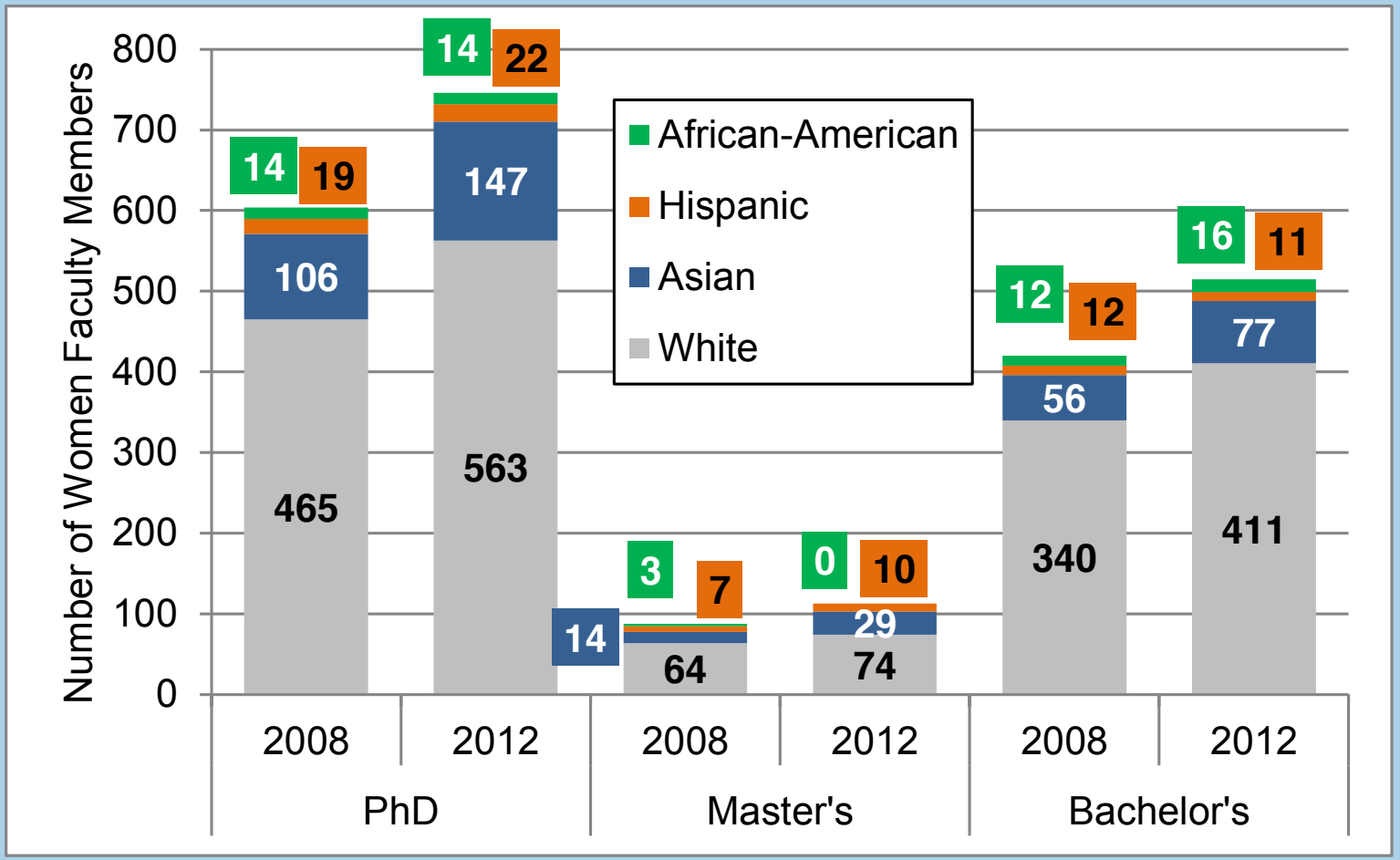
Further Challenges:
Intersecting Identities

Race and Gender - I



Race and Gender - II

Number of Women in Physics and Astronomy Departments, 2012
by Highest Degree Awarded (faculty members)



www.aip.org/statistics

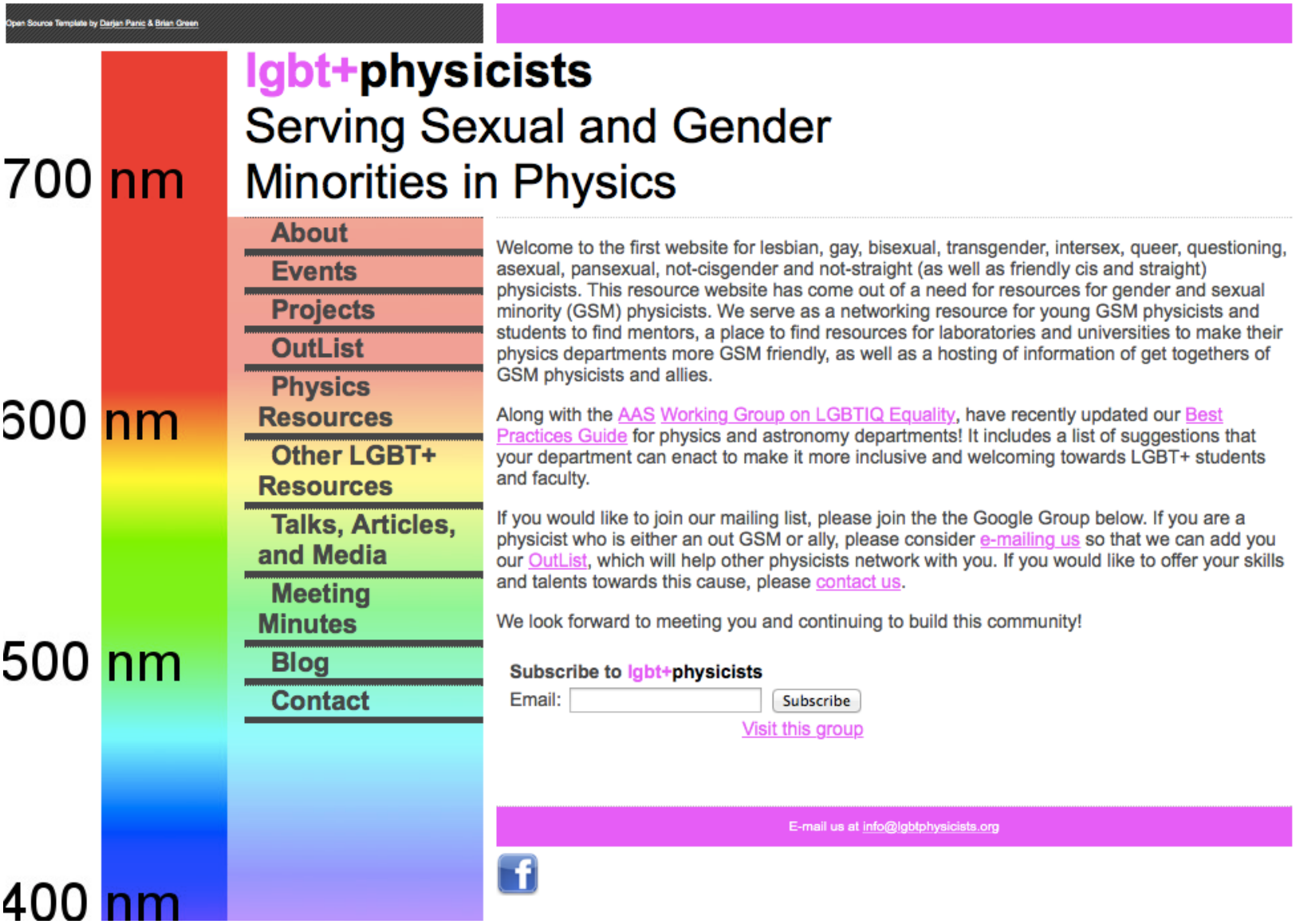
Gender and Sexual Orientation

Recent survey of LGBQ faculty (N=389) finds

- LGBQ women are significantly **less** likely to be out professionally than LGBQ men
- LGBQ women are significantly **more** likely to observe and experience exclusionary behavior (i.e. being ignored, shunned, or harassed)
- LGBQ women were significantly **less** likely to report being very comfortable or comfortable in their classrooms or on campus

Rankin, S., Barthelemy, R., Patridge E. !
The Experiences and Persistence of LGBQ Faculty. !
In preparation for The Journal of Diversity in Higher Education

lgbt+physicists.org



APS to Study Sexual and Gender Diversity Issues in Physics

By Michael Lucibella, APS News

The American Physical Society announced that it is putting together a new committee to look into issues of discrimination and exclusion in the field of physics based on sexual identity, gender identity, and gender expression.

The Committee on LGBT Issues is charged with preparing a report on ways to make the physics community more inclusive to individuals who identify themselves as lesbian, gay, bisexual, transgender, or other sexual and gender minorities. The report is due out by spring of 2016.

The committee plans to start with a survey of physics institutions across the country. "We're interested in understanding the climate for LGBT physicists," said Michael Falk, a physicist at Johns Hopkins University and chair of the new committee. "The first thing we have to do is a lot of fact-finding," Falk said. "We should try to get a measure of how many of us...there [are], where we are,… [and] the issues that LGBT physicists face."

Falk added that he expected to see a lot of variation across the country's physics institutions. "I don't think it's necessarily an easy thing to get a simple picture of," Falk said. "Some places are very welcoming, while other places are very exclusionary."

In addition, the committee is charged with putting together a list of recommended changes to common policies and practices in the physics community that affect LGBT physicists.

The committee grew out of LGBT+ Physicists, a group founded by Elena Long of the University of New Hampshire. She formed the small, informal forum in 2009 after finding few resources available for LGBT individuals once they completed their academic training. "There was really an entire lack of resources at the time," Long said. "I thought I would just start collecting them."

The group started meeting at the APS March Meeting, beginning in 2010. In 2012 the APS Committee on Minorities and the Committee on the Status of Women in Physics donated an invited session with 5 speakers to the group to present and discuss issues faced by LGBT physicists.

"APS and the LGBT+ Physicists group have been working together for a number of years," Long said. "We've kind of been building this relationship with APS from the start…. We're working to make the field of physics better and more inclusive."

Summary and Resources

Conclusions

- The Gender Equity **Challenge**:
  - Women's participation rate in physics (and other STEM fields) remains low compared to that of men.
  - Social science research implicates numerous causes: family responsibilities, dual-career issues, implicit bias, negotiation skills, isolation, intersecting identities ...
- Research also identifies **solutions** involving individuals, institutions, HR departments, and funding agencies
  - Clear, known, consistent, gender-neutral family-friendly practices
  - Open discussion of the importance of inclusion
  - Role models, skill-building and mentoring
- The National Labs can use these tools to improve inclusion of women and other under-represented groups in STEM.

FOR FURTHER INFORMATION

American Institute of Physics Statistical Research Center: www.aip.org/statistics/

American Physical Society

Gender Equity Report: www.aps.org/programs/women/workshops/gender-equity/

Best Practices: http://www.aps.org/programs/women/reports/bestpractices/

Faculty Family Friendly Edge: ucfamilyedge.berkeley.edu/

Gender Equity Project: www.hunter.cuny.edu/genderequity/

Guide to Inclusive Hiring: http://wiseli.engr.wisc.edu/searchguidebooks.php

Books and Articles:

- L. Babcock and S. Laschever [Negotiation], *Women Don't Ask* and *Ask For It*
- S.E. Page [Diversity and Teams] *The Difference*
- C. Steele [Stereotype Threat] *Whistling Vivaldi*
- Nature special issue: Vol. 495, 7 March 2013
- Inside Higher Ed, *Mend The Gap* [Career Advice Column by E.H. Simmons]

NSF ADVANCE Portal Website: www.portal.advance.vt.edu/

Michigan State's ADAPP-ADVANCE Project: www.adapp-advance.msu.edu/

LGBT+ Physicists Best Practices Guide: lgbtphysicists.org/files/BestPracticesGuide.pdf